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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/022,317	12/18/2001	William A. Wojtczak	451-Div	3248
25559	7590	12/16/2003		
ATMI, INC. 7 COMMERCE DRIVE DANBURY, CT 06810			EXAMINER CHEN, KIN CHAN	
			ART UNIT	PAPER NUMBER
			1765	

DATE MAILED: 12/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/022,317	WOJTCZAK ET AL.	
	Examiner	Art Unit	
	Kin-Chan Chen	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33, 38-45 and 50-57 is/are pending in the application.
- 4a) Of the above claim(s) 57 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-33, 38-45 and 50-56 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Election/Restrictions

1. Newly submitted claim 57 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claim 57 sets forth a method for CMP using a second slurry has a removal rate ratio of copper to barrier material of about 1:1 as opposed to the original claimed invention of higher removal rate of barrier material.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 57 is withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

2. Claims 1-33, 38-45, and 50-56 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification. In claim 1, "an oxidizing agent to a corrosion inhibitor weight ratio less than one" is new matter. For example, claim 10 recites oxidizing agent may be 0.1-1% and corrosion inhibitor may be 0-2%.

Art Unit: 1765

Any negative limitation or exclusionary provision must have basis in the original disclosure. The mere absence of a positive recitation is not basis for an exclusion. Any claim containing a negative limitation which does not have basis in the original disclosure should be rejected under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement. Note that a lack of literal basis in the specification for a negative limitation may not be sufficient to establish a prima facie case for lack of descriptive support. *Ex parte Parks*, 30 USPQ2d 1234, 1236 (Bd. Pat. App. & Inter. 1993).

3. Claims 1-33, 38-45, and 50-56 are rejected under 35 U.S.C. 112, first paragraph, The composition of slurries are critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Claim 1 does not set forth composition of the slurries (both first and second slurry) involved in the method/process of CMP copper, barrier, and dielectric wherein the CMP results in higher remove rate on copper (first polishing); and higher removal rate on barrier material, lower removal rate on the dielectric and intermediate removal rate on copper (second polishing). Therefore, Claims do not reasonably provide enablement for one skilled in the art to perform same function and effect. *In re Wright*, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993).

4. Claims 50-53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention because they are cancelled as stated in page 2 of the applicant's responses (October 29, 2003) but still show in the list of claims as original

claims. For the examining purpose, the examiner assumes that claims 46-49 are cancelled, rather than claims 50-53.

Claim Objections

5. Claims 12, 15, 20, and 22 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 103

6. Claims 1-33, 38-45, and 50-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mravic et al. (Us 6,083,840; hereinafter "Mravic") in view of Kaufman et al. (US 6,063,306; hereinafter "Kaufman").

In a method for chemical mechanical polishing copper, barrier, and dielectric material, Mravic teaches that two-step polishing may be used. First polishing slurry may be used to polish copper. Mravic does not disclose the removal rate of barrier material. However, the first slurry has a copper removal rate similar to the claims. It is expected to have the so-called lower removal rate on the barrier in the absence of any evidence showing the contrary. The wafer surface may be chemical mechanical polished with the first slurry. A second chemical mechanical polishing slurry may be provided. Mravic

Art Unit: 1765

teaches slurry comprises a fumed silica or colloidal, carboxylic acid (or dicarboxylic acid), an oxidizer, and other optional components. The first slurry has a pH within the claimed range and may be modified with ammonium hydroxide (col. 1, lines 19-23, col. 3 line 20 through col. 6, line 55, example 1, and claims 20-28).

Unlike the claimed invention, Mravic does not teach that the second slurry may has a higher removal rate on the barrier material and intermediate removal rate on copper. In a method for chemical mechanical polishing copper and barrier material, Kaufman teaches that two-step polishing may be used. First polishing slurry may be used to polish copper. The second slurry is able to selectively polishing the barrier with higher removal rate on barrier and intermediate removal rate on copper, see col. Col. 3, lines 27-31, and examples and Tables. Hence, it would have been obvious to one with ordinary skilled in the art to use composition and method of Kaufman in Mravic because both are used for the same purpose (polishing copper and barrier) and **because Kaufman teaches that using their second slurry would provide higher polishing rate on barrier material in the second-step polish.** Kaufman is silent in the polishing rate of dielectric layer of the second slurry. However, it is expected to have "lower removal rate" in the absence of any evidence showing the contrary. The combined prior art also teaches particles size, fumed silica and colloidal silica, using barrier material such as tantalum, tantalum nitride in the instant dependent claims.

"It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose."

In re Kerkhoven 205 USPQ 1069 (CCPA 1980). Cites *In re Susi* 169 USPQ 423, 426 (CCPA 1971); *In re Crockett* 126 USPQ 186, 188 (CCPA 1960). See also *Ex parte Quadranti* 25 USPQ 2d 1071 (BPAI 1992).

7. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufman et al. (US 6,063,306; hereinafter "Kaufman").

In a method for chemical mechanical polishing copper and barrier material, Kaufman teaches that two-step polishing may be used. First polishing slurry may be used to polish copper. The second slurry is able to selectively polishing the barrier with higher removal rate on barrier and intermediate removal rate on copper, see col. Col. 3, lines 27-31, and examples and Tables. Kaufman makes no mention of the polishing rate of barrier material in the first CMP slurry. However, it is expected to have "lower removal rate" in the absence of any evidence showing the contrary. Although Kaufman is silent about the polishing rate of the second slurry for the dielectric layer, it is expected to have "lower removal rate" in the absence of any evidence showing the contrary since there is no any numerical value for the removal rates is defined.

Response to Arguments

8. Applicant's arguments filed October 29, 2003 have been fully considered but they are not persuasive.

Applicant has argued that the Mravic teaches that **the second slurry** has no preference among copper, barrier, and dielectric material with selectivity of 1:1:1. However, Kaufman teaches the limitation of the claimed invention. As has been stated in the office action, it would have been obvious to one with ordinary skilled in the art to

use composition and method of Kaufman in Mravic because both are used for the same purpose (polishing copper and barrier) and because Kaufman teaches that using their second slurry would provide higher polishing rate on barrier material in the second step polishing.

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Merk & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). (our ref. Only ..MPEP 2145 IV.)

Applicant has argued that Kaufman discloses the oxidizing agent / corrosion inhibitor weight ratio approaches 25:1 and complexing agent (i.e., corrosion inhibitor) such as in col. 8, lines 21-26. In fact, the complexing agent including a list of materials in Kaufman (col. 8, lines 11-15) and corrosion inhibitor could be in the list of so-called forming agent in Kaufman (col. 8, lines 34-39). Furthermore, Kaufman's disclosure is not limited to a specific exemplified (materials) / process parameters. See *In re Fracalossi*, 681 F.2d 792, 794 n.1, 215 USPQ 569, 570 n.1 (CCPA 1982).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

Art Unit: 1765

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (703) 305-0222. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (703) 305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-2934.

December 9, 2003


KIN-CHAN CHEN
PRIMARY EXAMINER